



International
OBSERVE THE
MOON
NIGHT
2016

October

SAVE THE DATE

8TH



#observethemoon

OBSERVETHEMOONNIGHT.ORG

Planets, Moons and Meteorites, Oh My!

Who We Are: Ask a Scientist!



**Heliophysics & Planetary
Science Office**

Barbara Cohen, Lunar and Planetary Scientist
Renee Weber, Lunar and Planetary Scientist
Mitzi Adams, Solar Physicist



Marshall Space
Flight Center

Meteoroid Environment Office

Bill Cooke, Program Manager

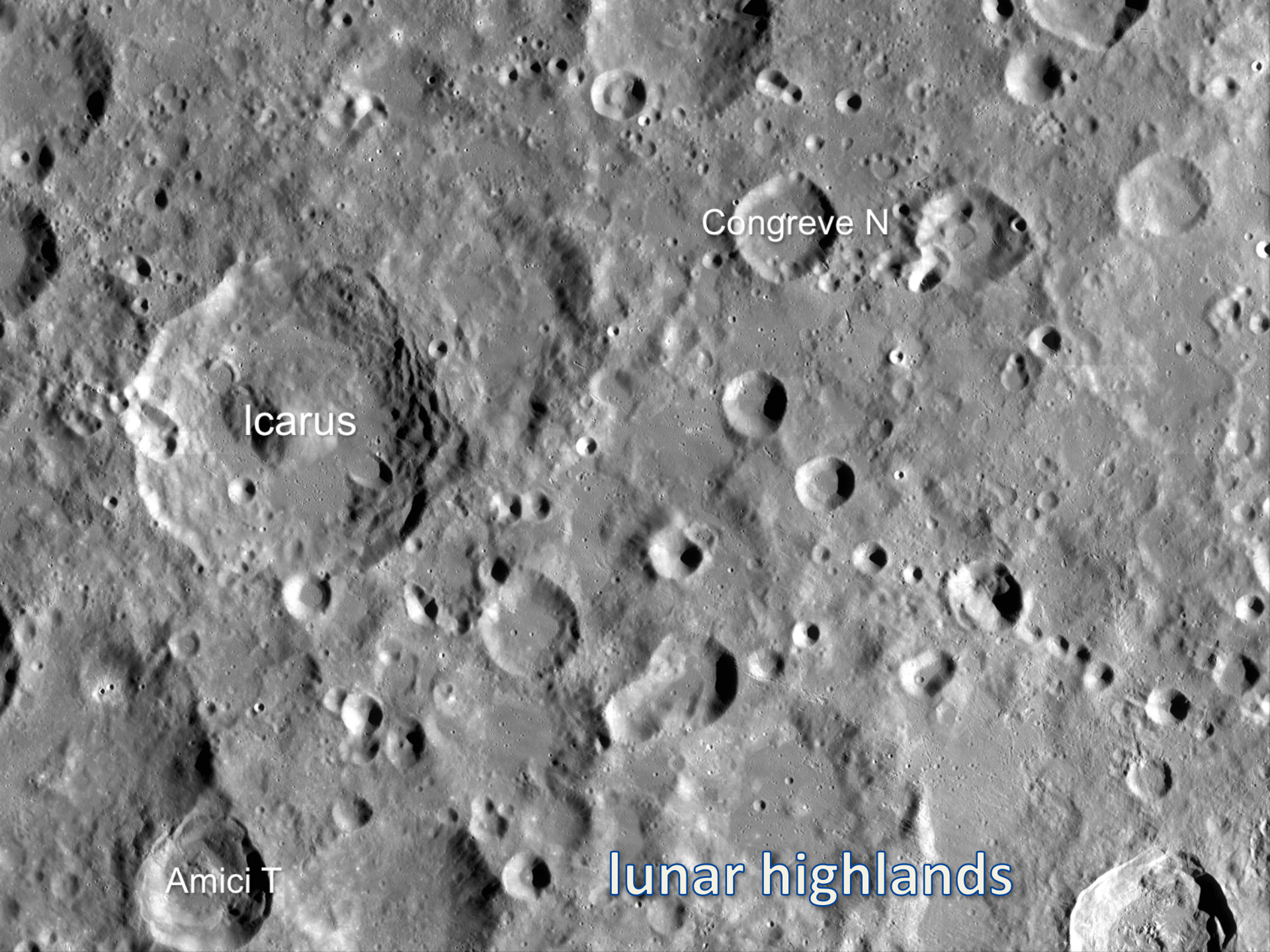


lunar mare



25 km



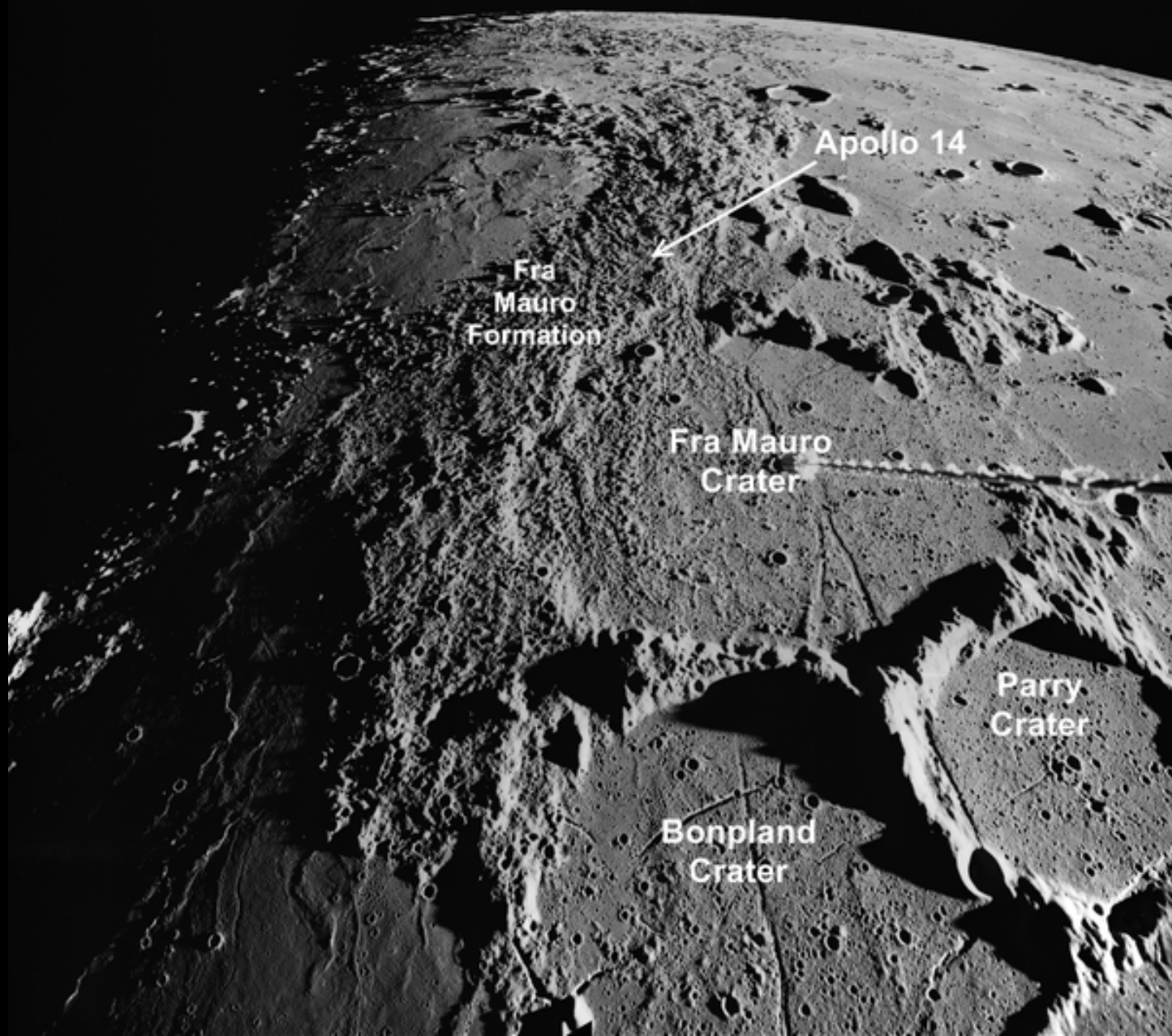


Congreve N

Icarus

Amici T

lunar highlands



Apollo 14

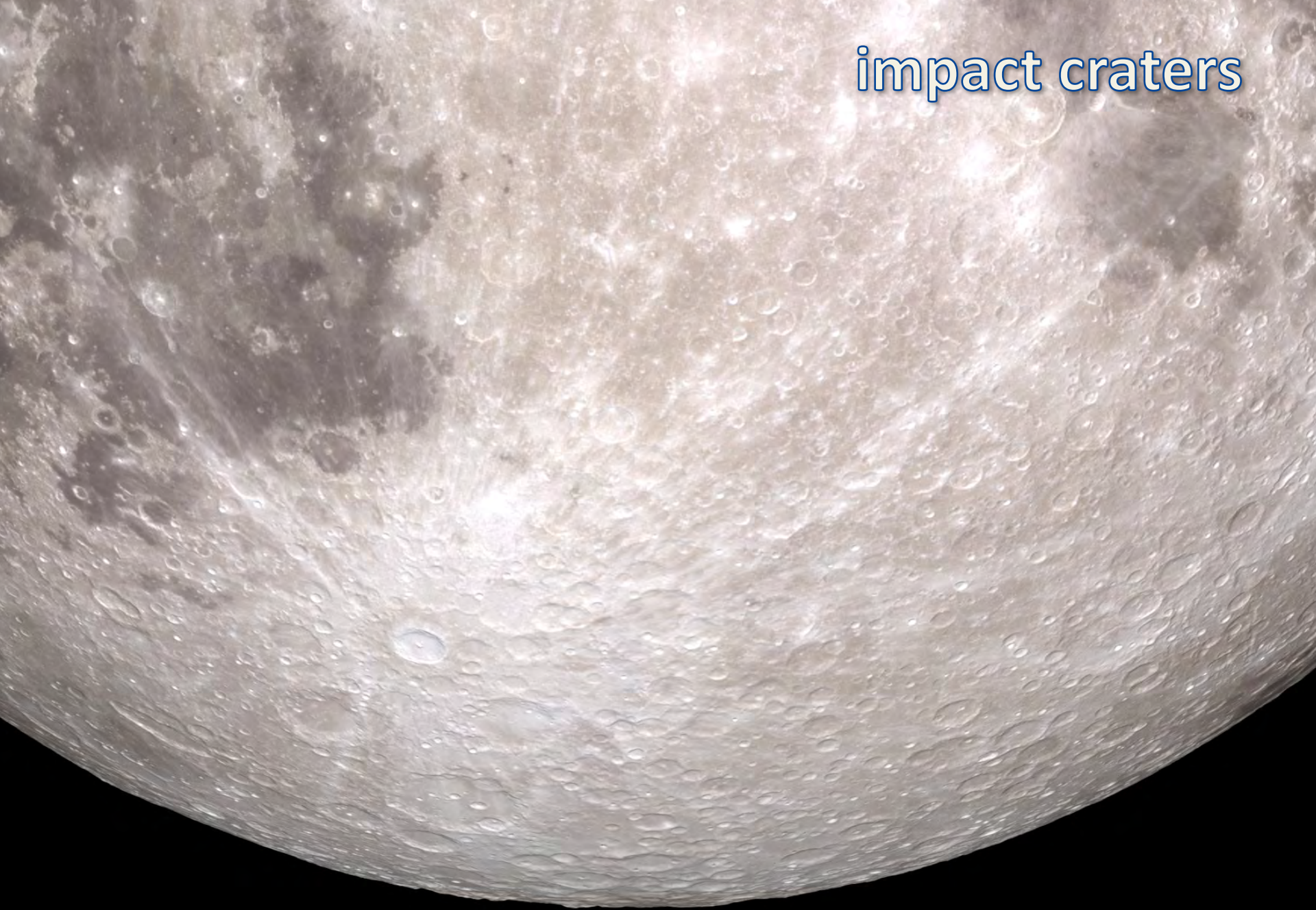
Fra
Mauro
Formation

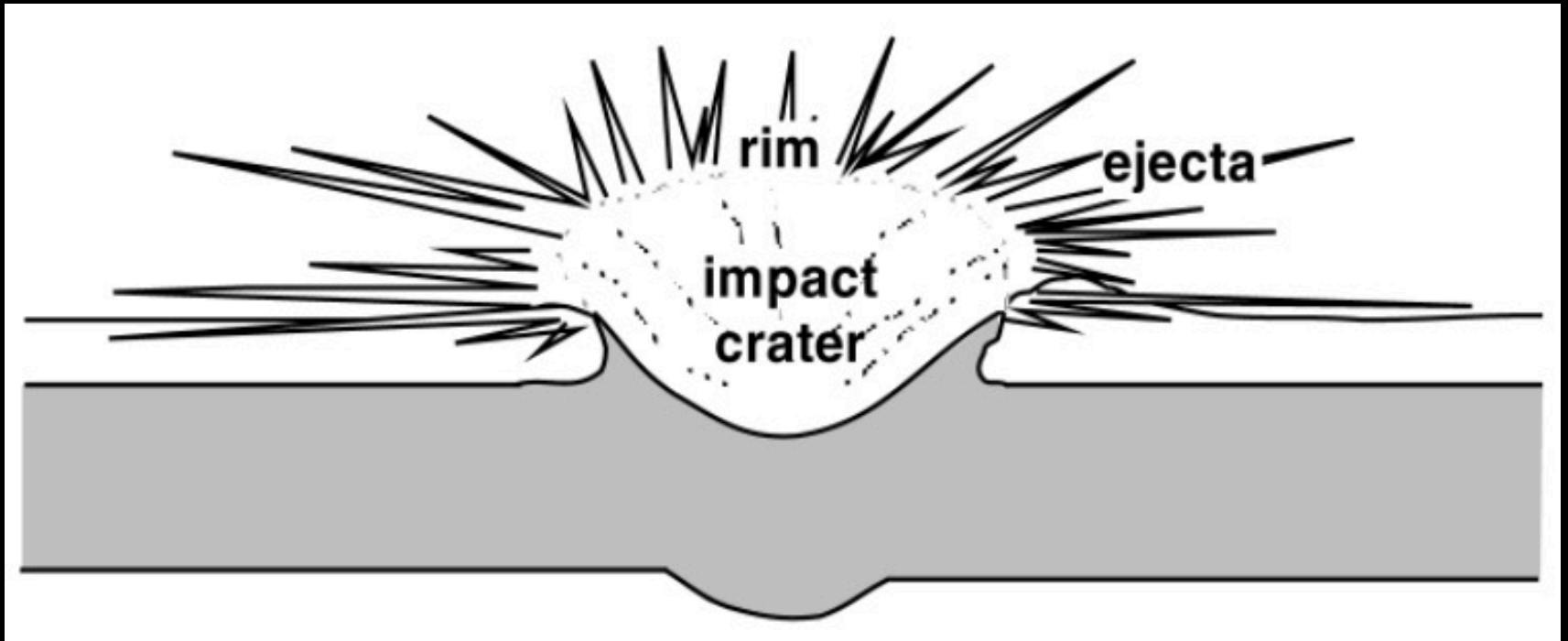
Fra Mauro
Crater

Parry
Crater

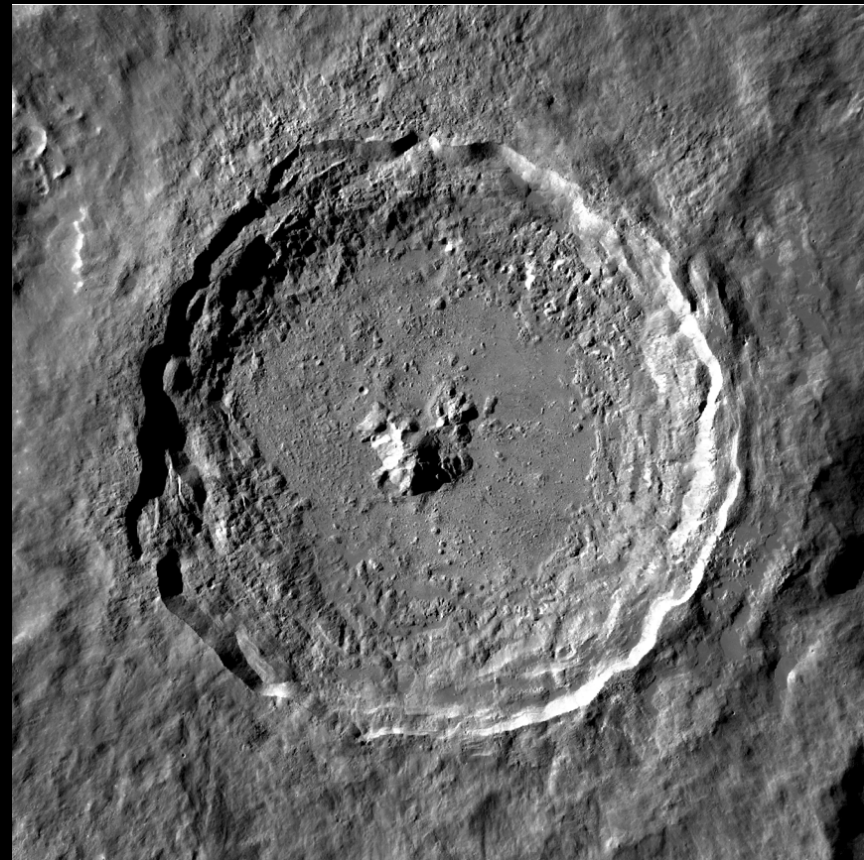
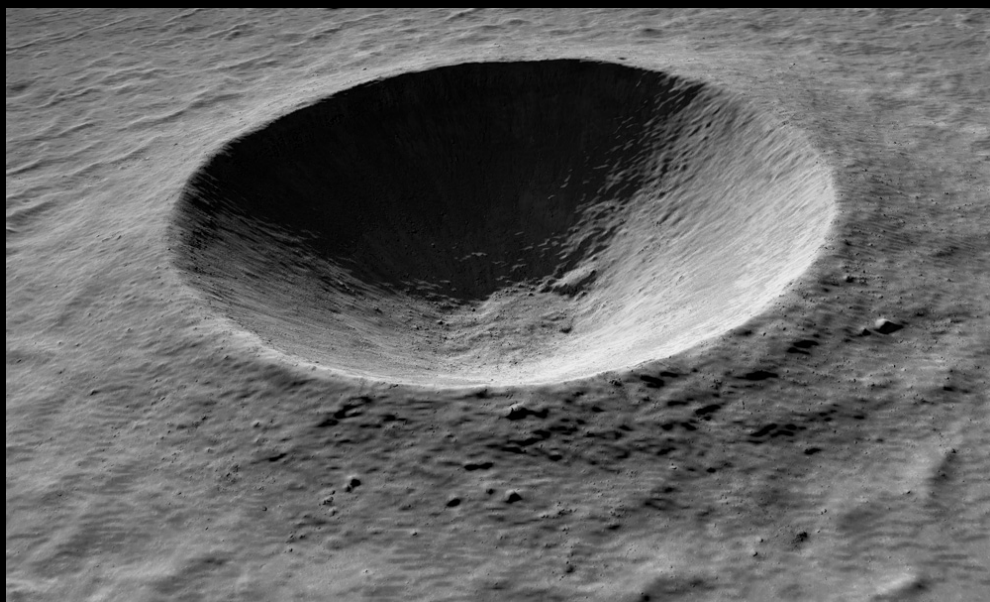
Bonpland
Crater

impact craters





crater formation and ejecta patterns



crater types

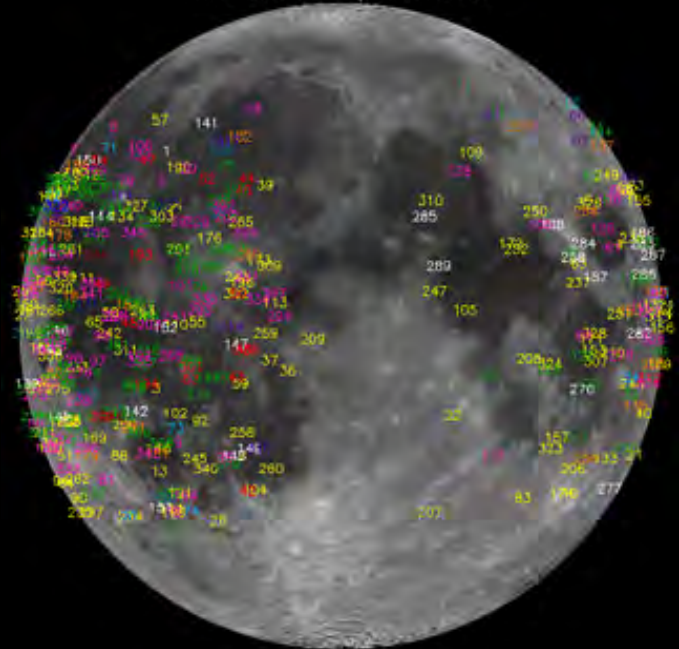
11.17.2006



impact flash monitoring



2005-2016 MEO Impact Candidates



The Great American Solar Eclipse

August 21, 2017

National Aeronautics and
Space Administration



After the 2017 solar eclipse, the next total solar eclipse visible over the continental United States will be on April 8, 2024.

The last total solar eclipse to cover this much of the country was on June 8, 1918.

If the Sun is scaled to about 10 cm (3.9 in), Earth would be about 10 meters away (33 feet).

What is a Solar Eclipse?

A solar eclipse happens when the Moon, as it orbits Earth, fully or partially blocks the light of the Sun, thus **casting its shadow on Earth**.

Observers within the **path of totality** can expect to see something like the image below. Observers outside the path of totality will see the Sun partially eclipsed as a crescent Sun (with safe filters).



©1990 by F. Espenak, MrEclipse.com



©1999, Photos by F. Espenak used with permission, MrEclipse.com.

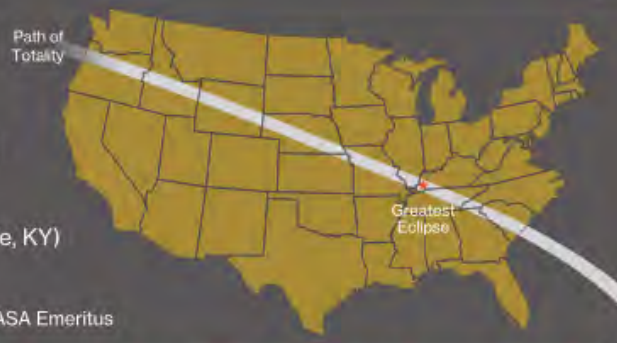
The predicted path of the August 21, 2017 solar eclipse

Duration of Greatest Eclipse:
2 min 40 sec
(18:25 UT=13:25 CDT or 1:25 p.m. CDT)

Location of Greatest Eclipse:
36 deg 58 min N; 87 deg 40 min W
(between Princeton, KY and Hopkinsville, KY)

Path Width: approximately 115 km

Eclipse predictions by Fred Espenak, GSFC, NASA Emeritus



Never look directly at the Sun unless you have filters that you know are safe.

For more information:

For more information about solar eclipses:

<http://eclipse/gsfsc.nasa.gov/SEhelp/safety.html>

<http://eclipse.gsfc.nasa.gov/solar.html>

<http://eclipsewise.com/solar>

<http://eclipse2017.org/>

www.nasa.gov



<http://mail.colonial.net/~Halter/index.html>

The NASA image above shows the Moon's **umbral shadow** as seen from the International Space Station during the total solar eclipse on 29 March 2006.

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FL-2016-06-52-MSFC G-157953

Safely Observing the Sun

WARNING: Never look directly at the Sun without proper eye protection. You can seriously injure your eyes.



Mirror in an Envelope

Slide a mirror into an envelope with a ragged hole cut into the front. Point the mirror toward the Sun so that an image is reflected onto a screen at least 5 meters (about 15 feet) away. The longer the distance, the larger the image.

Do not look at the mirror, only at the screen.

Photograph (below) Copyright © Elisa J. Israel



Strange Shadows!

Sunlight through trees produces projected crescents during partial phases.

Go Stick Your Head in a Box

You can make this simple "eclipse telescope" with some cardboard, paper, tape, and foil.

The longer the distance from the pinhole to screen, the larger the image of the Sun will be

White paper screen taped to inside end of box

Small image of partially eclipsed Sun



Sun Funnel

Make this device for your telescope with simple instructions at: www.astrosociety.org/toy/Build_a_Sun_Funnel.pdf

Cool in the Shades

Visit the Von Braun Astronomical Society (or your local astronomical society) and pick up a pair of these special Eclipse Sunglasses!

www.vbas.org



All images used with permission.

Local Area Eclipse Details

Location	% Covered	Start (CDT)	Max (CDT)	End (CDT)
Nashville, TN	100.0%	11:58AM	1:28PM	2:54PM
Totality begins 1:27PM • Totality ends 1:29PM				
Brentwood, TN	100.0%	11:58AM	1:28PM	2:54PM
Totality begins 1:28PM • Totality ends 1:29PM				
Franklin, TN	99.9	11:58AM	1:28PM	2:54PM
Fayetteville, TN	98.2	11:59	1:30	2:56
Ardmore, AL/TN	97.3	11:59	1:29	2:55
Florence, AL	95.9	11:57	1:28	2:54
Athens, AL	96.7	11:59	1:29	2:56
Decatur, AL	96.1	11:59	1:30	2:56
Hartselle, AL	95.8	11:59	1:30	2:56
Madison, AL	96.7	11:59	1:30	2:56
USSRC	96.8	11:59	1:30	2:56
Huntsville, AL	97.0	11:59	1:30	2:56
VBAS	97.1	12:00PM	1:30	2:56
Arab, AL	96.0	12:00	1:31	2:57
Gurley, AL	97.1	12:00	1:31	2:57
Guntersville, AL	96.4	12:01	1:31	2:57
Scottsboro, AL	97.4	12:01	1:31	2:57
Bridgeport, AL	98.6	12:01	1:32	2:57

JAVA Script Solar Eclipse Explorer
<http://eclipse.gsfc.nasa.gov/USEX/JSEX-NA.html>



Time	01 Jan 2016 00:00 UT
Phase	61.6% (20d 13h 31m)
Diameter	1779.5 arcseconds
Distance	402771 km (31.61 Earths)
Position	11h 47m 20s, 01° 32' 56"N
Subsolar	1.502°N 74.460°W
Sub-Earth	0.205°S 2.095°E
Pos. Angle	24.955°

Phases of the Moon



Moon Phases 2016 Including Libration and Position Angle



28 30 32

Time 09 Oct 2016 01:00 UT
Phase 48.7% (8d 00h 49m)
Diameter 1814.3 arcseconds
Distance 395037 km (31.00 Earths)
Position 18h 50m 54s, 18° 17' 53"S
Subsolar 0.869°N 85.140°E
Sub-Earth 5.713°S 6.317°W
Pos. Angle 353.233°

what you'll see tonight